

Status of the Pierre Auger Observatory

Eun-Joo Ahn

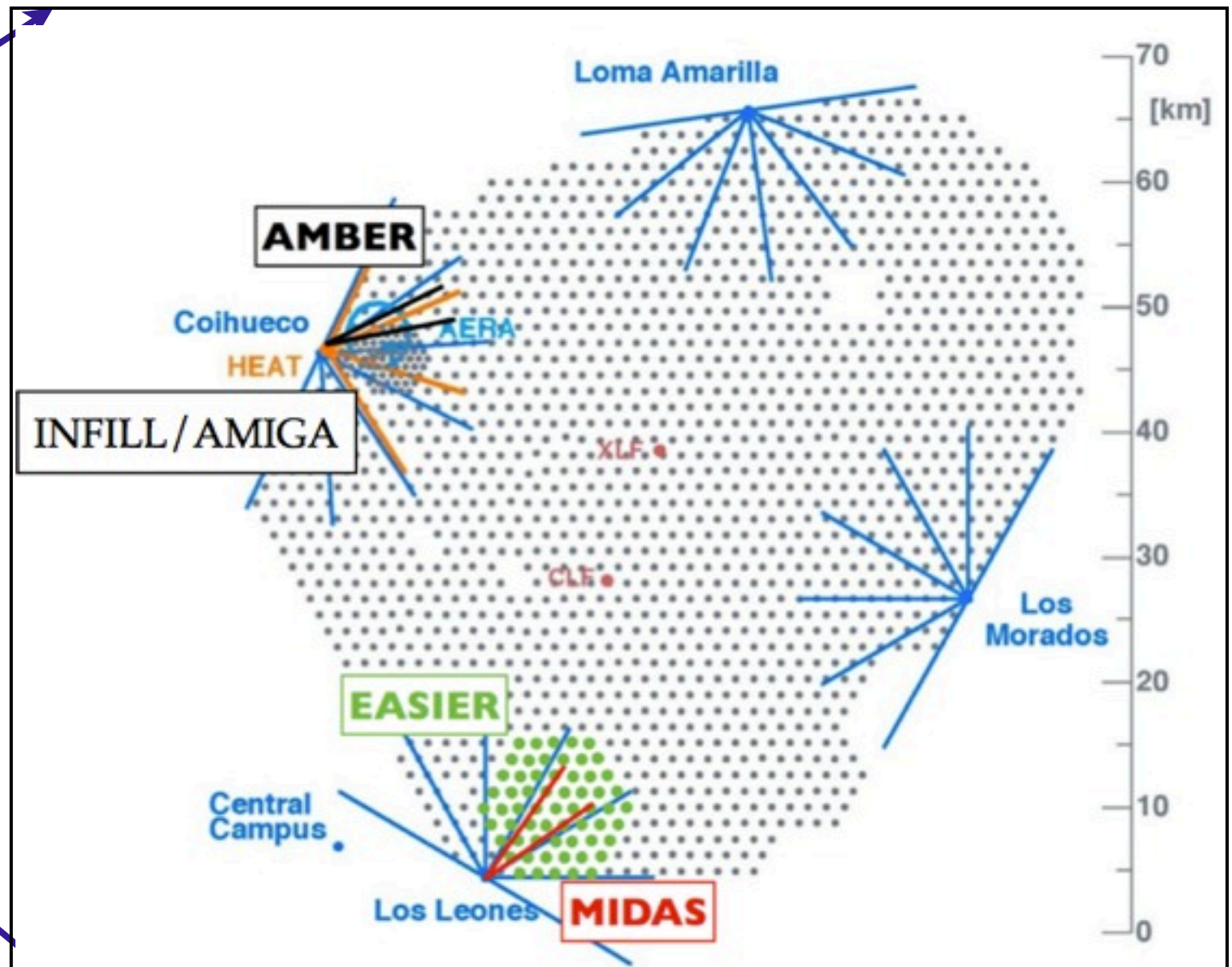
Fermilab



The Pierre Auger Observatory

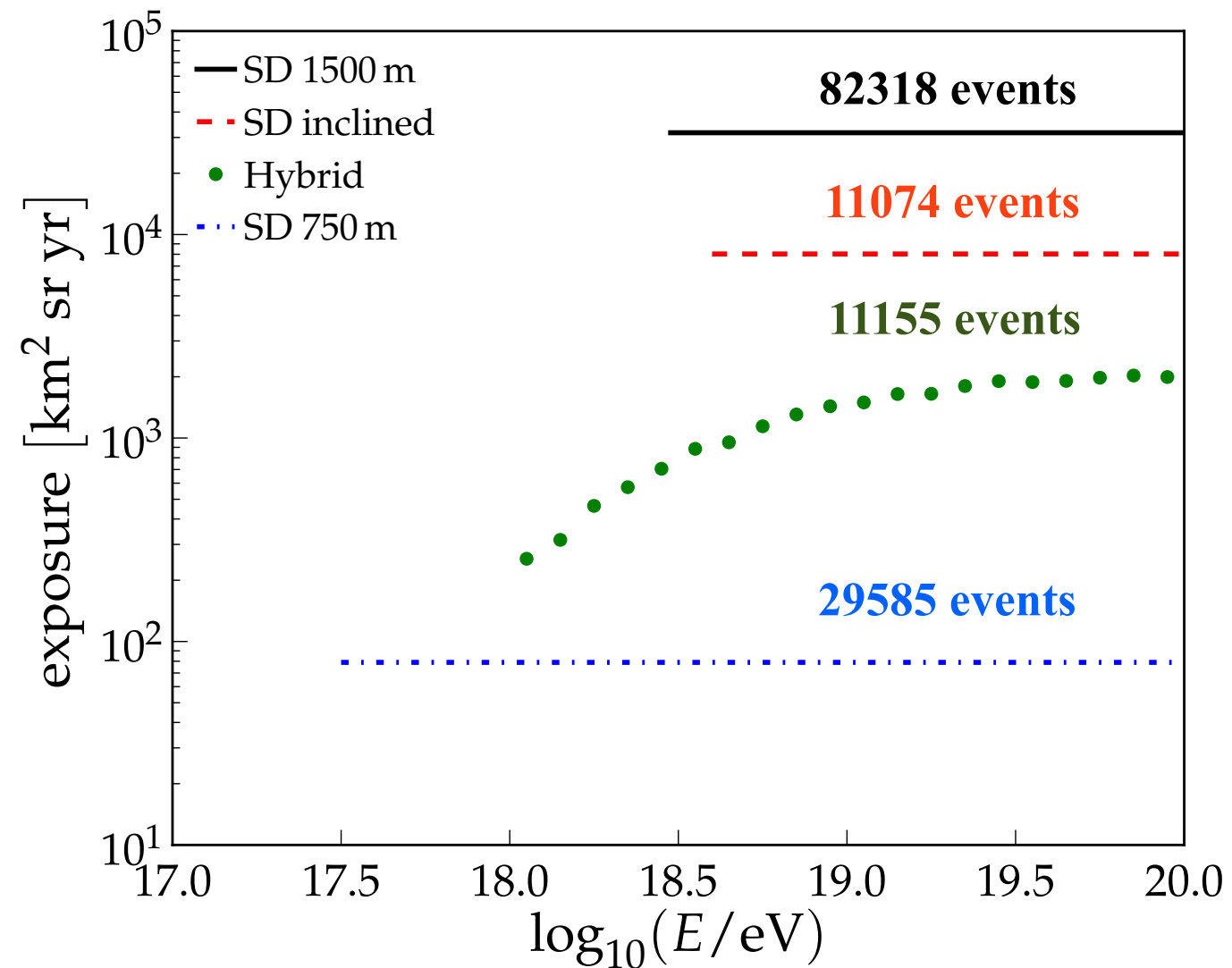
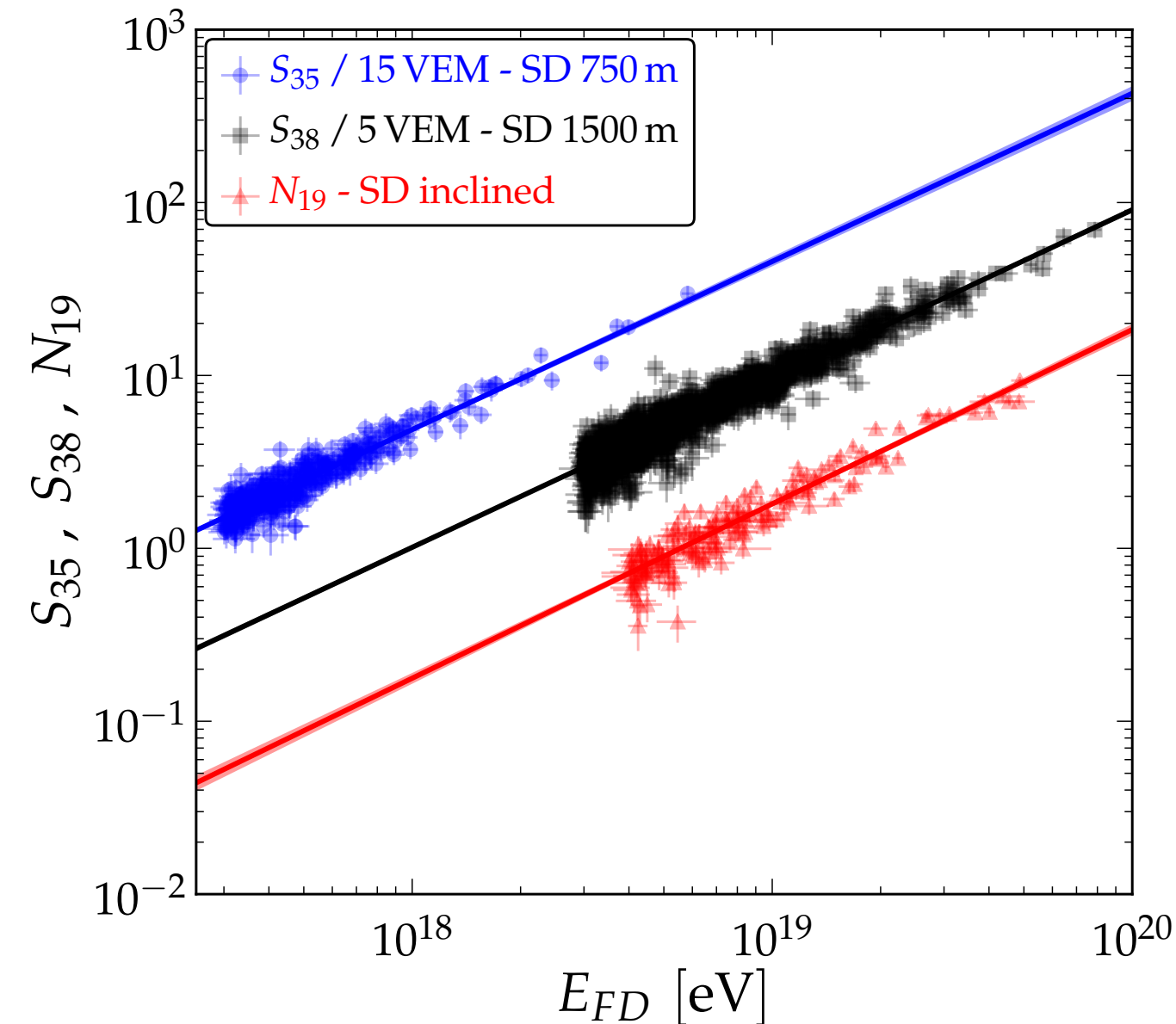
Observe, understand, characterize the ultra high energy cosmic rays
and probe particle interactions at the highest energies

- ▶ Malargüe, Mendoza, Argentina $\sim 3000 \text{ km}^2$
 - Hybrid: 4 air fluorescence detector sites & 1600 water Cherenkov detectors
 - Enhancements and R&D ongoing, upgrade to run beyond 2015 planned



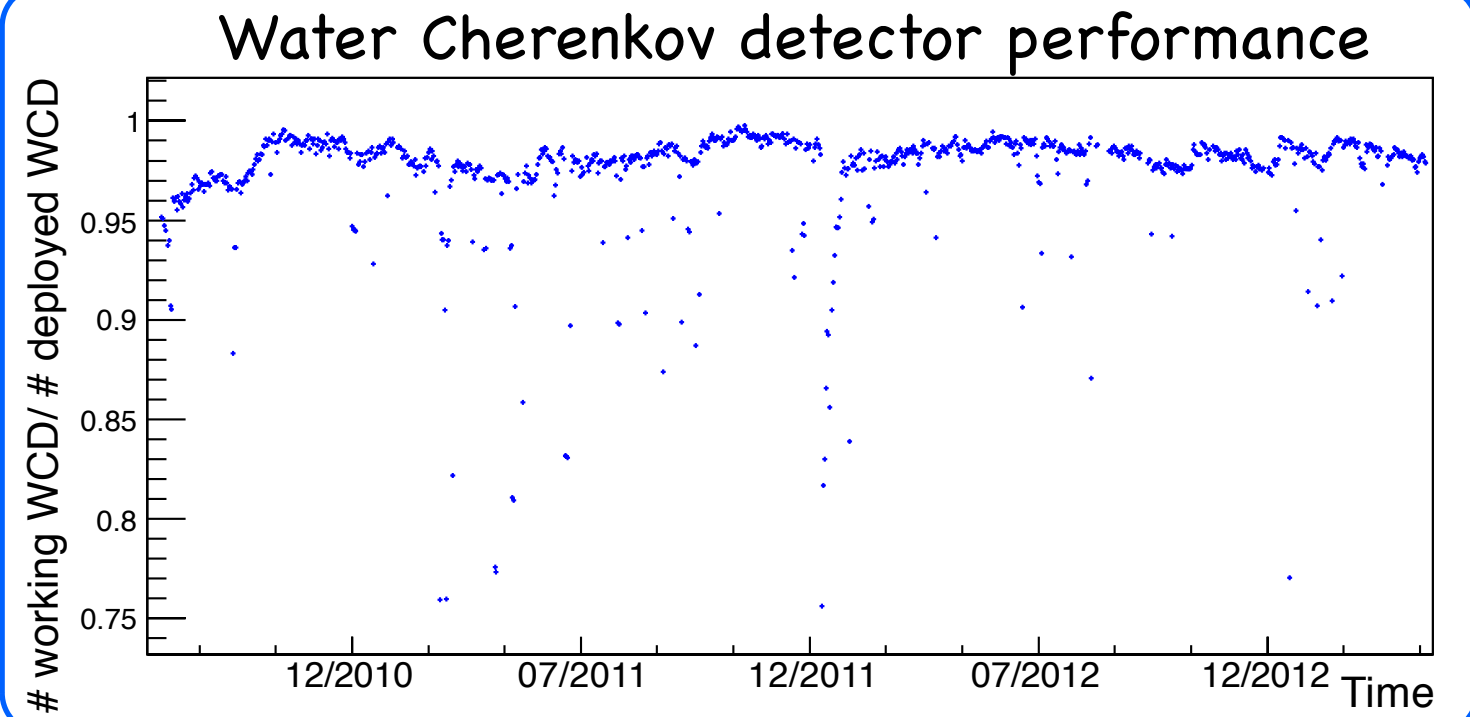
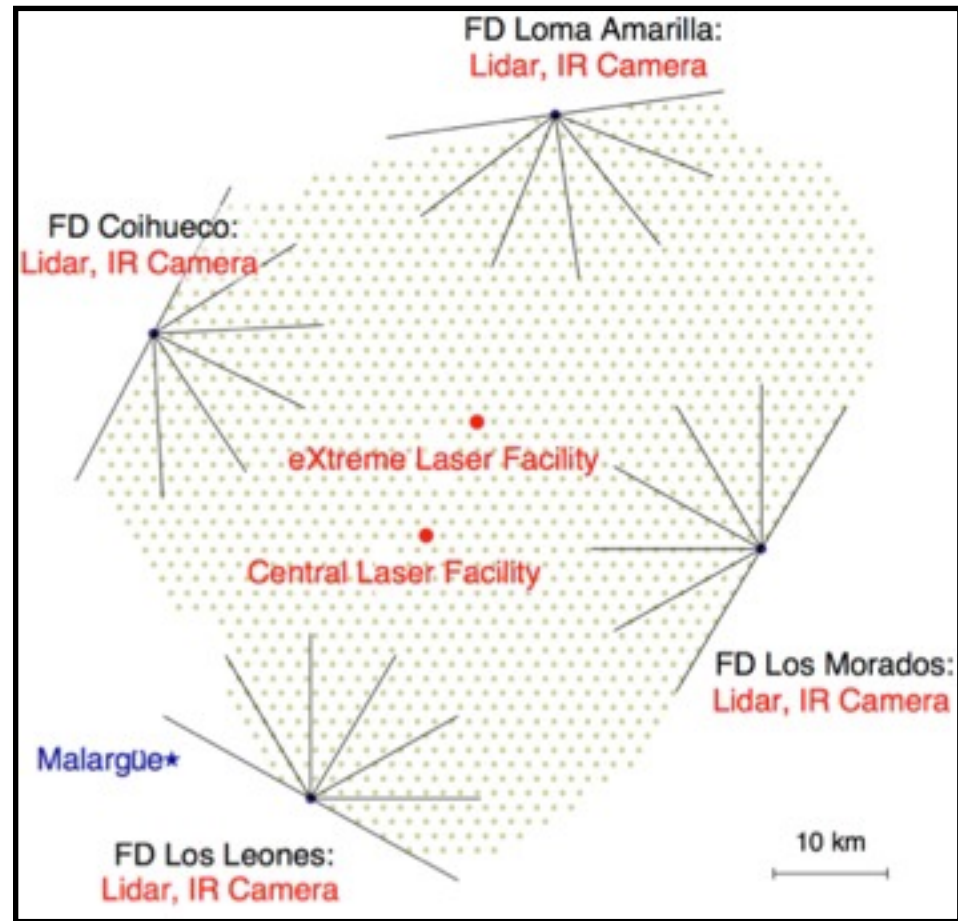
❖ Auger has the largest statistics & the best quality UHECR data

- Energy calibration via hybrid events

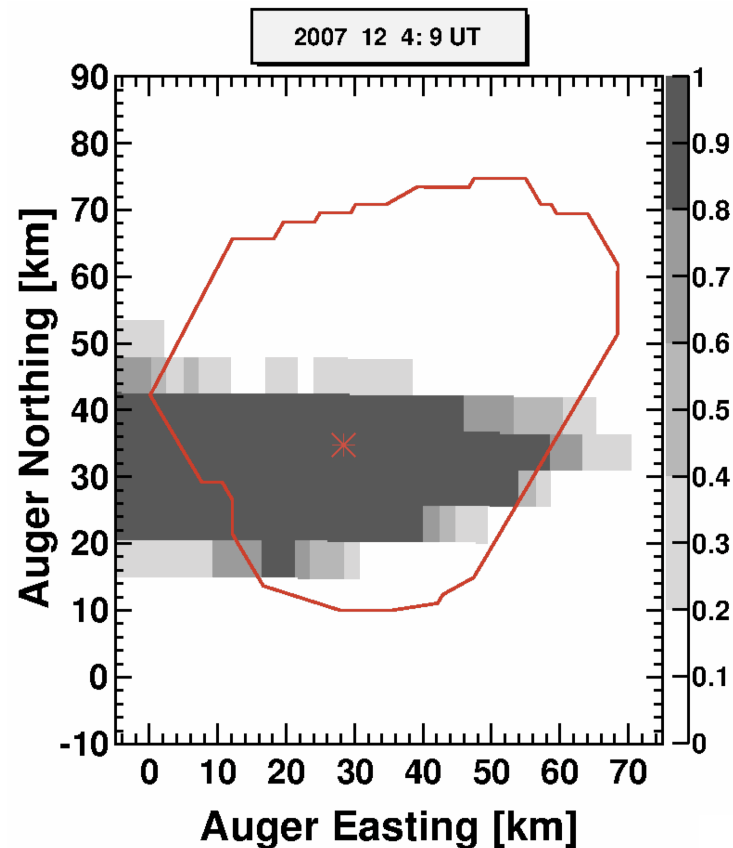
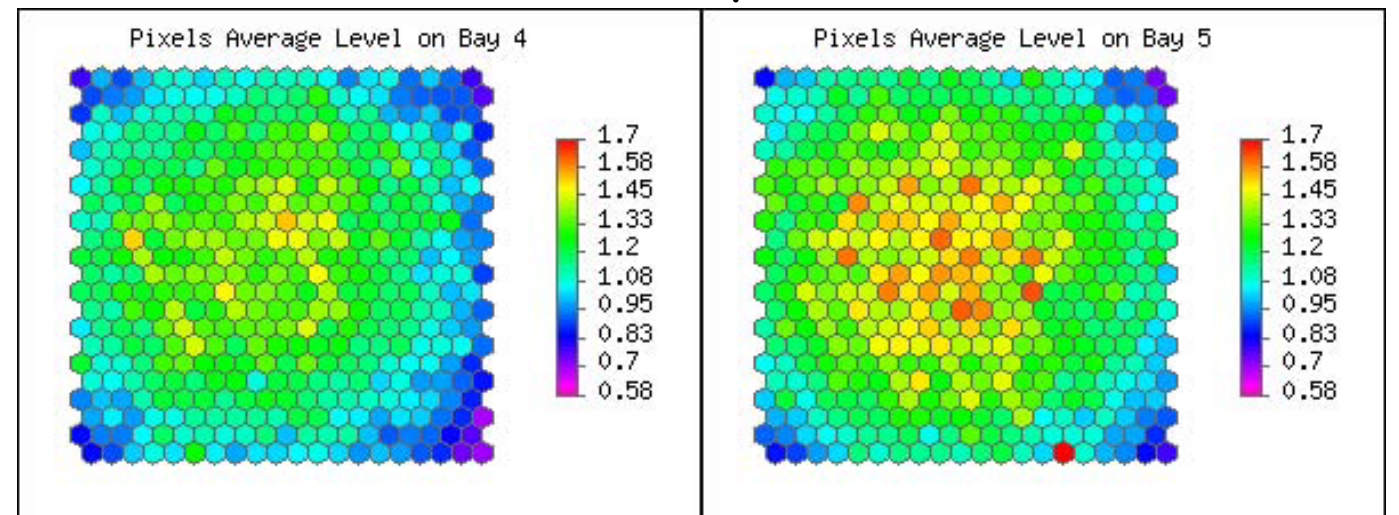


Aperture: 32 000 $\text{km}^2 \text{ sr yr}$
(additional 5000 km^2 each year)

❖ Detector monitoring



Fluorescence telescope PMT calibration

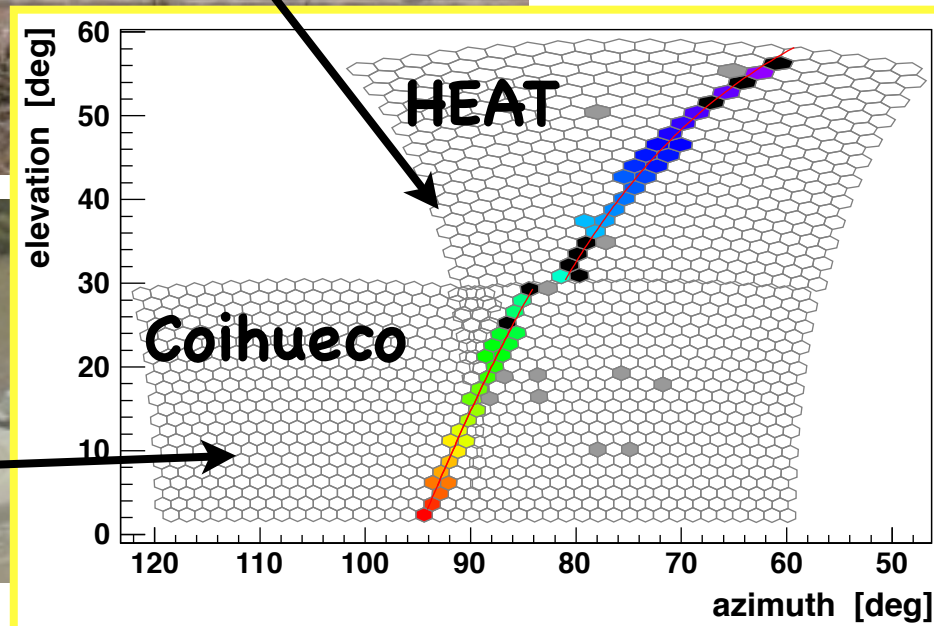
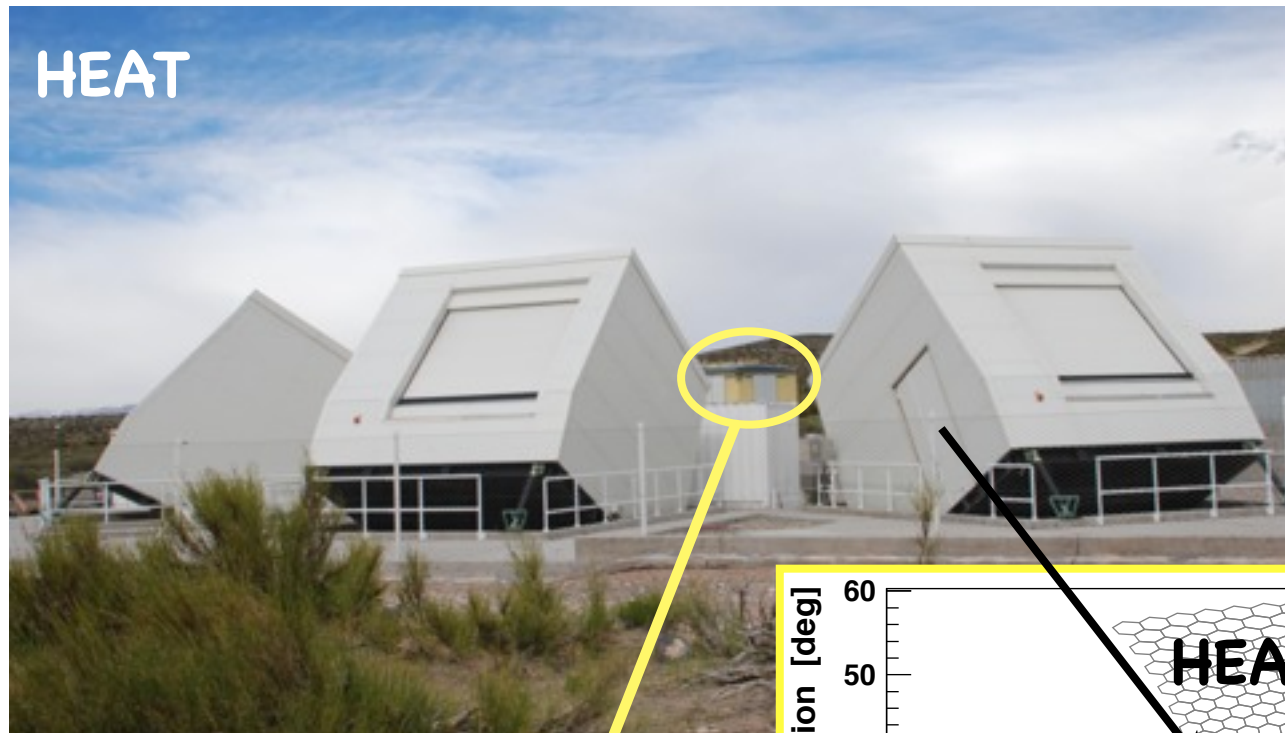


Cloud
monitoring:
← satellite
IR camera →



❖ Enhancements and R&Ds

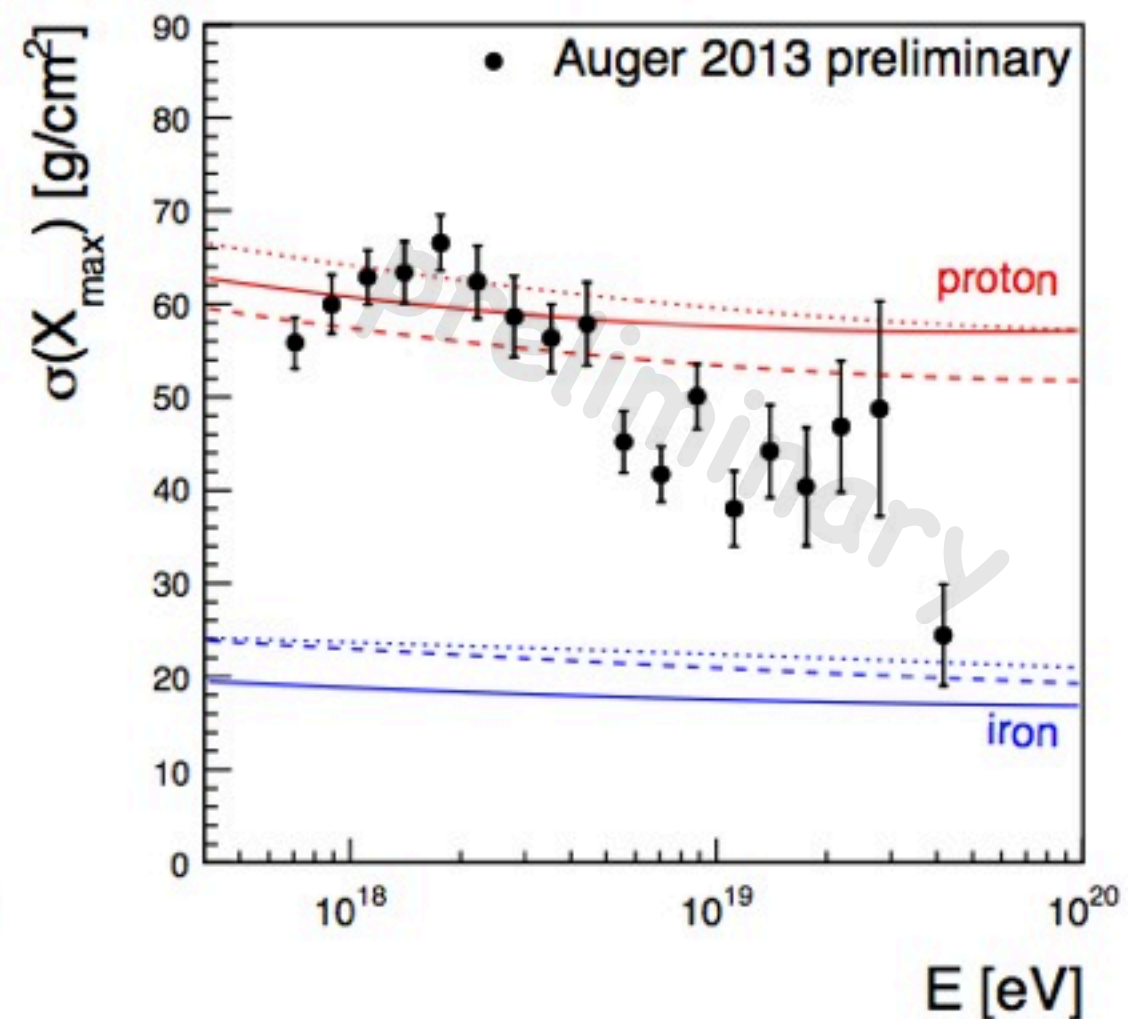
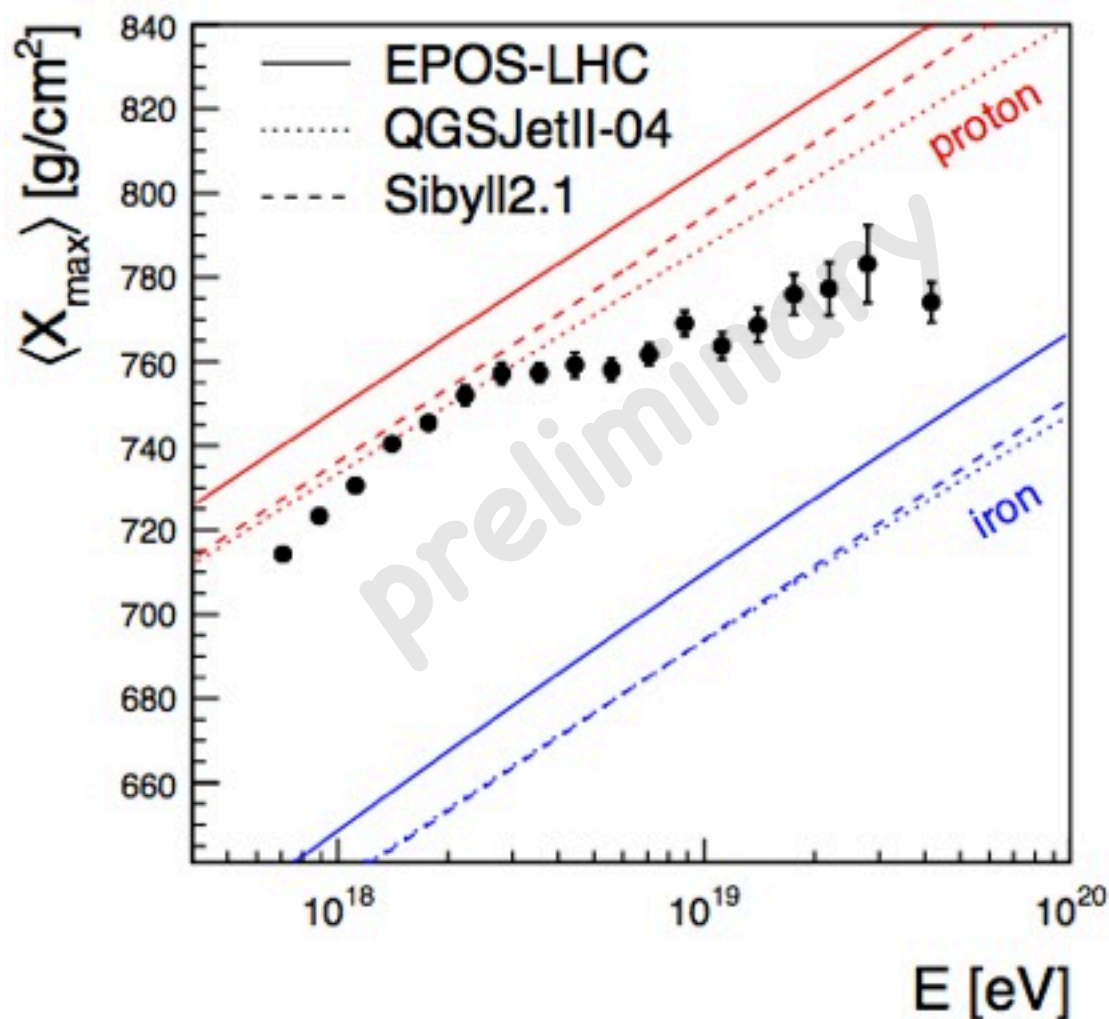
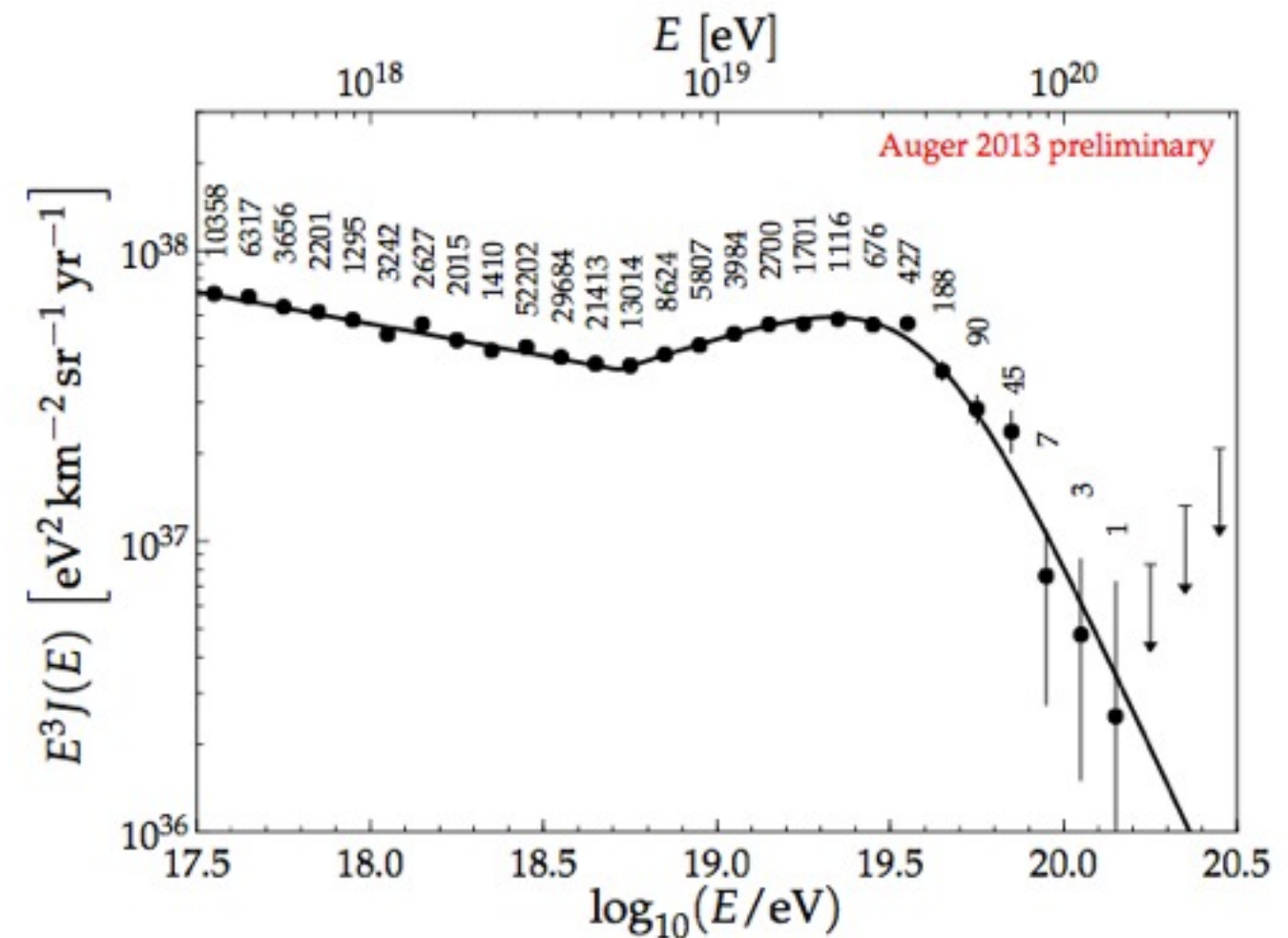
- High Elevation Auger Telescope (HEAT)
- Muons and infill -> extend down to $\sim 10^{17}$ eV, obtain better composition information
-> low energy hybrid trigger
- Radio: Auger Engineering Radio Array (AERA)
- Microwave: AMBER, MIDAS, EASIER



32 results recently reported at
the International Cosmic Ray
Conference (July 2-9 2013)

Energy spectrum →
(SD, hybrid combined)

Hybrid X_{\max} mean & RMS



Summary

- ❖ Auger has made significant contributions to the UHECR field with accurate measurements of CR properties above $E_{\text{lab}} = 10^{18}$ eV and unprecedented statistics:
 - ▶ energy spectrum with clear ankle and suppression features;
 - ▶ understand composition via X_{max} , muon numbers & production depth;
 - ▶ proton-air cross section measurement. etc.
- ❖ Enhancements extend energy down to $E_{\text{lab}} \approx 10^{17}$ eV
- ❖ Upgrade preparations to run beyond 2015 are in progress
- ❖ Perspectives for the next 10 years
 - ▶ Acquire more data (x3 in 10 years)
 - ▶ Composition & hadronic interaction information at the UHE